

AVIATION

The Oldest American Aeronautical Magazine

DECEMBER 13, 1926

Issued Weekly

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XXI

SPECIAL FEATURES

NUMBER
24

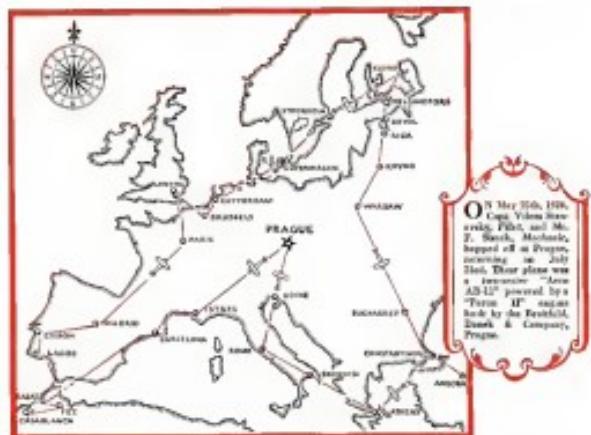
AN ECONOMY CHART FOR AIRPLANES
AIRPLANES AND PRIVATE FLYING
AIR MAIL STATISTICS SHOW INCREASED SERVICE

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y.
under Act of March 3, 1879.

The "Round-Europe Flight"



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With the Editor

Readers of AVIATION will notice a number of typographical changes which have been made in this week's issue and it is sincerely hoped that the general expression of opinion will be that these alterations improve the appearance of the magazine, which was the sole object of their incorporation. Furthermore, with the cooperation of the Bureau of Prisons, the Department of Commerce, Washington, D. C., a new department is started with this issue under the heading "Prisons Associated News Notes", in which it is planned to keep readers in touch with the general news of English air activities, giving special attention to news of value to the American Aircraft industry which may need, either directly or indirectly, to advance foreign trade in aircraft.

Please let me say this to another: it will not be out of place to draw attention to the highly interesting discussion by Prof. C. E. Powell on an encoder sheet for aviators. The author has thought it wise to give a clear mathematical proof of the method which he has formulated; the sheet but his article is written like so formidable in its approach that I doubt whether the empirical use of Professor Powell's device in the construction of an encoder sheet, especially in the case of small commercial machines will be found of value.



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W R I G H T

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AVIATION

VOL. XXI

DECEMBER 13, 1926

NO. 24

The Press and Aeronautics

THESE are no subjects on which the average airplane editor gives more weight than in discussing the manner in which the press treats an aviation accident. The fact that aeronauts are given unfair prominence and that, in playing up airship crashes, the newspapers are showing a deep popular interest in aviation. When a newspaper carries a forced landing as an "EGG CAPE FROM DEATH WHEN PLANE FALLS 2000 FT.", most men reach the boiling point and, if talk could kill, the city editor's job would be much more dangerous than that of the dare.

There is some justification in the pilot's attitude, but it is wrong when he says that the press prints on a whole page a photograph of the wreckage. Much of the press' interest in the accident is due to the fact that it has to be written with imagination or reality the result of ignorance in aeronautical matters, and the material result of being forced to create news which will appeal to the public. Furthermore, it cannot be overlooked that airplane accidents are in reality far less common than are automobile accidents and that few, alas, may, in the news paper editor, enhance their news value. In fact, it may reasonably be said that greater airplane accidents are somewhat rare.

The metropolitan press devotes a great deal of space to aeronautics. The pressman who was given the news of the Round-the-World Flight of the Army Air Corps undoubtedly had a very considerable bearing upon the general interest in aeronautics. The pressman also gave all the space that has been deserved to the news of the National Air Races particularly in recent years, and new speed and endurance records are always prominently featured. The magazine writers of the papers carry many interesting aeronautical stories.

There is a further aspect to the aeronautic subject. As already mentioned, it is true that aviation accidents are sometimes given more prominence than are automobile accidents, but, apart from the latter being far more common than the former, automobile accidents are usually much less spectacular than are airplane accidents. In nearly all cases, however, the news is carried in the automobile section last when an airplane flies across the continent and establishes a new record for speed as far as endurance is concerned. The story about it gets a place on the front pages of the newspapers. This event is inherently spectacular.

The larger daily newspapers, in almost every case, now have aeronautical correspondents whose stories are frequently as accurate and reliable as interesting as any articles carried in the daily press. It is up to them and all aeronautical people, especially in the smaller communities, to cooperate with the press and try to impress to it sane and accurate knowledge. The average reporter is really anxious to get the facts but getting the facts accurately and writing them up so as to give them in as the last moment as a paper goes to press is not an easy task. The aeronauts exert a great influence on public opinion and it should be part of the business of everyone possessing an accurate knowledge of aeronautics to see that the press gets the straight dope and that aviation gets fair treatment.

The Demand for Commercial Engines

THERE is little doubt that, during the past year or so, there has been a decided change for the better in civilian aeronautics in this country. The manufacturer has become a fixed bus operator; he is more businesslike and has his tangible property and sometimes money in the bank. Airports are rapidly increasing in number and air transport lines have been established. Civilian aeronautics has become stabilized so that the manufacturer of aeronautical products can count on a fairly definite demand and if the product is satisfactory the demand will be continuous and intense in volume.

The manufacturers of civilian airplanes are supplying this demand satisfactorily. There is no doubt but in the minds of the engineers that in not altogether true. The engine is really the main weapon of the airplane and with the increasing development of aeronautical planes, the demand for qualified power plants of aeronautical engines will grow.

Although the supply of aero engines engines is not equal to the possibilities of a market, the engines are already in use. Furthermore, there has been only one very big engine which has really been found suitable to aero commercial living and civil service, whereas there is already a growing need for other types of engines.

The development of an engine requires a large outlay in experimental costs and until the ultimate demand for aero engines can be reasonably foreseen, the expense is not likely to be recovered. Yet from the financial point of view there is probably no section of the aeronautical manufacturing field which offers a more promising probability than that of the production of engines for office machines. The production of aeronautical engines is another specialized branch as it is not a question of aeronautics production as in the case of the automobile race, nor is it possible to develop to put into the production of aeronautical engines the same overhead charges which are demanded in the case of the military regular engine due to the necessity of adhering strictly to war requirements. Those who are now considering possibilities in the manufacture of civilian engines are entering into a field which has many difficulties but which is so fundamentally important and in which the demand is so insatiable that their future depends only on their ability.

Sir Alan Cobham Honored at Aviation Dinner

Aeronautical Chamber of Commerce Entertains British Flyer of Function Highly Representative of American Aviation. Itsbin Schneider Cup Winner Present.

THAT THE next step in the development of aviation as the dominant element of the American scene in the past century will appear in the expansion of the airplane as a means of transportation was the consensus at a luncheon organized by the speakers who gathered Monday morning, Nov. 20, to witness the dinner in honor of Dr. Leslie Goldsmith, the well-known British flier, who arrived in the country Nov. 25, as a guest here, with Lord Cobden. The speakers stressed the fact that the aeronautics and transportation field have been the most important and successful field having, in the last few years, been developed, and were unanimous in their opinion that in general design, the coming year will be one which will support the inflated expectations born from the earlier ones.

At the Southern Table

The dinner, which was held at the Whistler Arms, New York, under the auspices of the American Chamber of Commerce and was one of the most freely attended in the history of American aviation, four hundred guests representing all of America's major cities were present. Major speakers included the Honorable James C. Cagin, State Senator Oliver S. Sturtevant, Doctor E. A. Steadman of Washington, one of the speakers' hosts, as well as Josephine Secretary of War for Aviation, Captain F. D. Durand, Assistant Secretary of War for Aviation, E. P. Munson, Assistant Secretary of War for Aviation, Major General W. M. McRae, Major General H. G. Holloman, W. Peirce Thompson, president of the National Aerospace Association, Harry F. Thompson, Vice-W.H. H. Gray, Capt. Paul Henderson, president, Aeromarine Chamber of Commerce, Wm. Condit, T. G. Holloman, Test Pilot Attendant, Washington, S. C. Wood, assistant of the Director of Civil Aviation, May L. Johnson, Mrs. Frank B. Murphy, Mrs. George M. Morrison, Mrs. Frank M. Morrison, First of the Air Corps, General Charles Fahey, Doctor General Edward J. Steves, managing director of the National Aerospace Chamber of Commerce, and F. E. Belcher, vice-president of the American Legion Ex-Servicemen, who has recently returned from the British Isles. An American Air Transport Fund was established at the dinner.



Sir Alan and Lady Cottrell presented to the Society by Her Royal Highness Queen Elizabeth II, from Edinburgh to London.

Continental Trip of Bud Flaps Ends

Harry E. Guggenheim, president of the David Guggenheim Fund for the Education of Americans, has authorized the following:

aversion propagandist. Taping can bring new vision, comfort and pleasure to men. Had mankind been an audience for a thousand years, he would not encounter such evil right language as is trip among usages, such as I did in a recent language.

The speaker said that in the future a pack of Elbow pants would be as much of a concern now as were drives, as automobile, because certain would be one of the accusations he had. He urged the development of lightplants, because they were the best way to get rid of the flies. The speaker next took up the subject of the mosquito. Speaking on this topic, he said that the mosquito was the most important insect in the country. Speaking on this topic, he said that the Mosquito Day might be usurped for another American holiday, we being born here by immigrants from Europe, and the Mosquito Day might be usurped for another American holiday. In closing he thanked the American Chamber of Commerce and his wife, and Dr. H. G. Henshaw.

and the City Water Supply.

In closing the address for the evening, W.B. Hines paid high tribute to those who developed the art and, particularly, Mr. Otto Preissig, himself, whose unusual and unique personal qualities of sound judgment and incorruptibility were especially responsible for the early development of that service which thereafter received a lasting charter. He called the audience and the greater part of modern advancements and supply space by audience for assistance in protecting the American public to the non-commercial function of services and the sending of his best regards. He agreed with previous speakers that the most

and of the day, so far as it has been concerned, is the drawing of interest self-sacrifice to stand back of the expenses and costs to give the chance of getting down with one of the greatest servants mankind has ever developed. In this mission, Mr. Hayes, will a prominent place for the Association Chamber of Commerce. He paid the compliment of those

In closing, Colonel Henderson briefly introduced each of the members of the congressional delegation.

— 1 —

Among those present were T. B. Thompson, president of B. F. Pratt & Wright Aircraft Corp.; Charles Tamm, president of Chance-Vought Corp.; Charles E. Lounsbury, president, Wright Aeronautical Corp.; C. M. Koss, president of the Curtis Aeroplane & Motor Co., Inc., Columbus; J. C. Hartman, U.S.N., Admirals II Class; of the Goodyear Pool; Dr. S. A. Boul, Elmer A. Sperry, president of the Sperry Gyroscope Co.; Paul D. French, of the Aerostart Development Co.; W. E. Gandy, president of the General Precision Aerophysics & Motor Co., Inc.; G. C. Peacock, of the Wright Aeronautical Corp.; Albert F. Lovell and Oliver Lounsbury, of the Loening Aeroplane Manufacturing Corp.; Charles H. Galbraith, of the Pioneer Instrument Co.; Charles Eberhart III, president of the Rheinstahl Aeronautical Mills Co., Inc.; R. J. Shulman, president of the Shulman Manufacturing Co.; Dr. W. E. Parsons, president of Parsons Aerotest; George Henry G. Blodget, of the General Electric Co.; Dr. Edward F. Warren, of the Smiths, Worcester, Mass.; and Col. David F. Warner.

Microsoft Examples

The *Brachida* project at Aranda will produce 150 GigaWatt hours of electricity per year.

An Economy Chart for Airplanes

Effect of Wing Area on Speed, Economy and Speed Range Shown Diagrammatically

By PROF. C. H. POWELL,

President of Aeronautics Dept., University of Texas

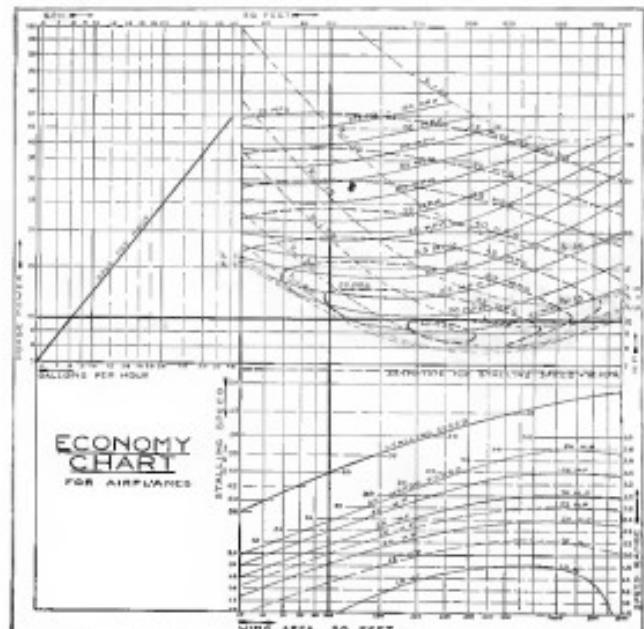
IN SCIENTIFIC investigation of any sort it is frequently found necessary to eliminate one independent variable at a time, and determine its effect while keeping all the rest fixed. It is the same principle which is effectively applied to the testing of new engines for example. It is not necessary to set up the cause of an effect when a multitude of changes in adjustment are made simultaneously.

In the chart about to be described, the performance features of an airplane are investigated for changes in wing area only, all the other factors such as fuselage weight and resistance are supposed to be kept constant. At the present, at least, the effect of altitude, in a general manner, the effect of change in wing load on speed, economy and speed range

for either a given lift coefficient or a given horse power, and the general effect of such alteration are thus known; the effect of other variables may be investigated from the starting point.

This chart, then, represents a series of surfaces, all having the same base and the same range but differing in wing area. In general, the total weight will depend upon the wing area. The horse power is considered to be varied in the throttle and variations of weight are not considered here for the reasons given above.

It will be seen, therefore, that the use of the chart is entirely qualitative but, even so, by the choice of suitable data its construction it can also be used to give accurate



and quantitative information as to speed and economy on light planes.

At a point from which to start, a plane circles to the 1923 Cornell Lockheed P-80 Hustler is taken. The characteristics of such a plane are given below:

Horsepower = 590
Total weight = 3500 lb. per sec.

Resisting force = 35 miles per hr. 8.0 Gches.

Wing area (at this particular point) = 78 sq ft.

Fuselage weight and all weight extra to wings = 2000 lb.

Wing weight at 100 sq ft per sq ft = 1.5 lb.

Total weight = 4515 lb.

Wing Specific Weight = 1.07 lb.

Data for the wing section were taken from Technical Note, NACA No. 118, Explains and Applied Theory corrections were made according to NACA Report No. 124.

A Practical Example

From these data, a value for the parasite resistance was estimated as follows:

We have for horizontal flight, Weight = Lift.

$$\text{or } W = L = k_1 S p V^2 \quad (1)$$

$$\text{or } k_1 = \frac{W}{S p V^2} \quad (2)$$

Where:

V = Speed, ft. per sec.

W = Total weight in lb.

S = Wing area in sq ft.

k_1 = Absolute Lift Coefficient.

k = Absolute Drag Coefficient (wings).

p = Standard Density = 0.00233 slugs per cu ft.

Putting in the values from above, $k_1 = 350$ and, from the wing curve, the corresponding $k = 0.003$.

The horsepower is given by:

$$H = \frac{W}{\eta} = \frac{L}{\eta} = \frac{k_1 S p V^2}{\eta} = \frac{4515}{0.85} = 5290 \quad (3)$$

Where H = Horsepower.

η = Total drag of plane, ft.

η = Propeller efficiency

or $\eta = 0.85$

$$H = \frac{W}{\eta} = \frac{W}{0.85} = \frac{4515}{0.85} = 5290 \quad (4)$$

when the values $H = 35$ and $V = 100$ are substituted.

Further, we have:

Total Drag = Wing Drag + Parasite Drag

$\Delta = p V^2 S + p V^2 k_2 S$

$\Delta = p V^2 (k_1 S + 2k_2 S)$(5)

Where k_2 = All Parasite Drag Coeff.

$\Delta = \text{Normal Prop Area} \cdot D$

and D is the summation of all the parasite drag areas with their respective drag coefficients.

The expression for the parasite drag of an airplane is "the sum of parasite areas" times the "so-called Equivalent Specific Gravity error," frequently used.

Substituting the value $k_2 = 0.006$ and $S = 78$ sq ft and putting in the value of $k = 0.003$ ft., then:

$$\Delta_{par} = 810 \text{ sq ft. for the outer fuselage.}$$

This value may be checked by the expression

$$\Delta = \frac{W}{L/D} = \frac{W}{k_1 S} = \frac{4515}{350 \times 78} = 1.5 \quad (6)$$

The expression used for calculating the Horsepower is derived as follows:

$$\text{Total weight} = \text{Wing weight, weight of all other parts.}$$

$$W = 4515 + \Delta \quad (7)$$

Where W' = Weight of plane without wings.

Δ = Weight of wings in the par. 21.

$$\text{From (1) and (3) } V = \sqrt{\frac{(W + \Delta)}{S}} = \sqrt{\frac{(4515 + \Delta)}{78}} \quad (8)$$

$$\text{and } \Delta = (k_1 S + 2k_2 S) \frac{V^2}{W} \text{ also } V = \frac{\sqrt{W}}{\sqrt{k_1 S + 2k_2 S}} \quad (9)$$

$$\text{From (4) and (5) } \Delta = \frac{(W + \Delta)}{W} \frac{V^2}{k_1 S} = \frac{(4515 + \Delta)}{4515} \frac{V^2}{k_1 S} \quad (10)$$

$$\text{Combining (2), (5) and (10) } \frac{1}{H} = \frac{1}{4515} \frac{1}{k_1 S} + \frac{2k_2 S}{4515} \quad (11)$$

$$H = \frac{4515}{4515 - \frac{1}{k_1 S} - \frac{2k_2 S}{4515}} = \frac{4515}{\frac{4515 - 1}{k_1 S} - \frac{2k_2 S}{4515}} \quad (12)$$

$$H = \frac{1}{\frac{1}{k_1 S} - \frac{2k_2 S}{4515}} = \frac{1}{\frac{1}{0.003 \times 78} - \frac{2 \times 0.006 \times 78}{4515}} = \frac{1}{21.4} \quad (13)$$

In the chart, Horsepower is plotted as a function of the area S for constant values of Lift Coefficient k_1 . The constant k_2 values are shown as short dotted lines.

Minimum Power Criterion

It will be seen that, for a given Lift Coefficient, i.e., a given angle of incidence, there is an area giving a minimum value of horsepower required for horizontal flight. This value can also be found by differentiation and equating the result to zero. This gives the result:

$$5.5 W k_1 + \sqrt{4515 W k_1 S + (5.5 W)^2} = 0 \quad (14)$$

The Velocity term is readily computed from equation (1) and are shown as full lines. They indicate horsepower H as a function of area S for given velocity. It will be seen on the chart that, for a given horsepower, there is a certain area giving a maximum velocity.

Economy = E = most economical expressed in miles per gallon. Equivalently,

$$\text{Miles per Gallon} = \frac{G}{H} \quad (15)$$

As a convenient approximation, the gallons per hour is assumed to be proportional to the horsepower, which it is nearly a fact when the engine is not throttled down excessively. Thus, gallons per hour = G/H . Where G = Gallons per hour, and the Miles per Gallon = $E = G/H$.

In the chart, a value of Gallons per hour by $G = 0.41$ has been taken. The Miles per Hour has a curve to the left of the chart. From this line and the speed lines are computed the Miles per Gallon. These which are plotted in broken lines have having the form of straight line segments.

Fuel Consumption

It will be seen that there is a maximum instantaneous value of miles per gallon of a little over 60 miles per gallon in this particular instance, with wing area of 550 sq ft. flying at 100 mph and using but 8 lbs.

If the Lift and Drag Coefficient of the wing be given, then the condition of maximum miles per gallon at such

Left Coast, is found from:

$$\text{Miles per Gallon} = E = \frac{662 V}{G.H. + \frac{V^2}{250} + \frac{K_1}{K_2}}$$

$$E = \frac{662 V}{G.H. + \frac{V^2}{250} + \frac{K_1}{K_2}}$$

From (4)

$$E = \frac{375 K_2 S}{G.H. + \frac{V^2}{250} + \frac{K_1}{K_2}}$$

$$E = \frac{375 K_2 S}{G.H. + \frac{V^2}{250} + \frac{K_1}{K_2} + \frac{W}{S}}$$

The value for K_1 and K_2 , which gives a minimum value of miles per gallon E , occurring at V_0 and S_0 can now be found by differentiating E with respect to S and equating to zero. The value of S thus found, is given by

$$S = \sqrt{\left(\frac{W^2 K_1}{G.H.} \right)} \quad (4)$$

The following problems worked out by the chart will be ample to demonstrate its use in showing the effect of variation of S with a given V_0 .

(1) Given the horsepower $H = 20$. What areas are required for maximum miles per gallon. Ans. $S = 120$ sq. ft., Speed = 72 mph, $k_1 = 32$, the miles per gallon = 42; the speed range = 12, the starting speed being 50 mph.

(2) A plane is to fly at a lift coeff. of $k_1 = 32$. Find the area which will give the most miles per gallon. Ans. $A = 120$ sq. ft.; the horsepower = 32; the miles per gallon = 42.

50 and the speed = 48 mph.

(3) Given an area of 150 sq. ft., what horsepower is required for maximum miles per gallon. Ans. Horsepower = 32; miles per gallon = 48; speed = 56 mph, and $k_1 = 36$. (4) For a given economy, say 40 miles per gallon, what area gives the least horsepower. Ans. Area = 120 sq. ft. and horsepower = 62.

(5) If the lift coeff. is taken as $k_1 = 35$, what areas will be required to keep the same horsepower as in (4). Ans. Area = 120 sq. ft., horsepower = 25, speed = 47 mph, and the miles per gallon = 42.

(6) If the horsepower $H = 30$, what areas will give the maximum speed. Ans. Area = 112 sq. ft., speed = 72 mph, and the $k_1 = 32$.

(7) For the given fuselage under consideration and a wing area of 75 sq. ft., what is the starting speed. Ans. 56 mph.

(8) For a given required economy of 40 miles per gallon, what area will give the highest speed. Ans. Area = 96 sq. ft., and the speed = 78 mph.

(9) Given a horsepower of 20, what lift coeff. gives the greatest speed. Ans. $k_1 = 39$ and the speed = 60 mph.

(10) For a given economy of 40 miles per gallon. Ans. Speed = 65 mph, economy miles per gallon = 40; the area = 96 sq. ft., economy = 56 miles per gallon.

(11) Given a required economy of 38 miles per gallon, what is the smallest area we can use. Ans. Area = 96 sq. ft.

(12) Given a required speed of 76 mph., what area makes the economy greatest. Ans. Area = 120 sq. ft. and the miles per gallon = 42.

Air Mail Bids Asked on Two Routes

Postmaster General Nine on Nov. 15 invited proposals for the transportation of air mail between New York and Chicago. On Dec. 11, the Bell, Croydon and Day Lines, Lewis Granda and North Marine, Inc., Croydon and Black Springs, Wyo., Salt Lake City, Utah, Elko and Reno, Nev., and Stevensons, Ltd., in San Francisco, Calif., and various, a distance one way of 2,000 mi. The bids are remarkable. Jan. 12.

This action is intended to start off a new era of competition in public transportation. The small lines to whom it was addressed will perceive entanglements were strong enough to remain their operation. Postal officials today indicated that the Government is not an operating agency, and when from the inception of the idea of transportation of mail by air there has been no intention of competing in the transportation field.

Assurance was also made that the proposed new minimum rate of 30 cents a half ounce for air mail, is all points in the United States will be put into effect.

The contracts for air mail lines will be let in two sections. The first will include the "Yankee to Chicago" leg of the transcontinental route, and the second section will cover the West and Chicago, both of which run via Indianapolis, Ind., and Cleveland and Dyers, Ohio.

The second section will be to Chicago to San Francisco route, via Iowa City, Des Moines, Omaha, North Platte, Cheyenne, Salt Lake City, Reno and Sacramento.

The schedule will require an average flying speed of at least 50 m.p.h., with allowance for slower time for weather conditions. The cost of delivery of mail will be left to the Postmaster who is to receive a maximum revenue of 1,000 mi. per dollar from Chicago to San Francisco by air line longer 1,000 mi., and that restoration will be required to a maximum revenue of \$1.50 a lb. for the first 1,000 mi., and not exceeding 20 cents a lb. for each additional 100 mi.

A load of 250,000 is required with the proposal and will be concurrent with the bond furnished under the contract.

by the successful bidder. The contract load will be fixed at not less than \$100,000.

The accepted bidder will be required to provide necessary equipment in his building or in the field or fields, to properly package and dispatches air mails by post office departmental methods.

Contractors must present plans of other contrivances or construction lines to land and take-off at field or fields on this route when such planes are actually engaged in transporting mails to or from this route.

The contracts will be open to all transportation and by air lines carriers in the United States, and the Post Office Department is well pleased with the suggestions.

With the recent success of a service for interairportage and express by air, postal officials feel that commercial activities will rapidly develop a solid basis and that continued application of scientific methods of transportation will set in a contrast to the progress of private aviation. The air transport committee Oliver, in speaking of the present situation, said: "For the Government to remain in the field would soon displease all service, since it cannot carry express packages under present rates and could only operate at degree economical complete at losses."

Portugal Plans Round-The-World Flight

The Portuguese World Flight, which the Government of Portugal has planned to accomplish, will begin early in January, 1927. The personnel, as released by the Ministry of War, is Major Dr. Barros, Capt. José Gómez, Capt. Jorge de Gusmão and Capt. Luís, Major Antônio Gómez, Major de Brito and Major Gómez, and the commanding officer being General Mota, in Lisbon, and General Modesto, in Madrid, and from Lisbon to Mexico, in 1928.

The flight will cover 40,000 kilometers, 3,200 of which will be over the Pacific Ocean. Twenty-two stages will be made at the principal cities along the route. A seaplane, equipped with two Loiret motors, will be used.

Lightplanes and Private Flying

Low Powered Flying As the Basis Upon Which Cheap Airplanes May Be Produced

IN THE exhibition of new art, there is always a long and field for speculation of use laid at another regarding the future and what region or series of causes the development in most likely to follow and what may be the eventual outcome. One of the many reasons for growing interest to the possibility of the staying power of the civil and commercial airplane. This, as presented in a wide subject, being divided, as it is, into three very distinct classes, namely, as transportation, aerial service, and private flying and so forth. Each of these classes requires a study within itself but they all, as a whole, concern the same industry, namely, that of a normally equipped machine, fast or economical and civil aviation, very comfortable property lines.

A Definition of Private Flying

At this time it is proposed to set down clearly also on the possible future of private flying without attempting in the least to meet the entire subject or to claim any sequence of thought on the subject. As private flying is assumed to be a field equivalent to that of the private automobile even as it is to the commercial airplane, the future may be very near, who goes to the airplane for the same reason as the automobile, and that is to have the pleasure of flying, the pleasure of meeting others and that of his associates, with all intentions of making money by air traveling. A man, for example, who purchases an airplane to travel him in getting about the country in pursuit of his regular business would be termed a private pilot, as would be as much as an aviator of a wireless station, for the purpose of his own personal convenience. In any fact or strongly the case of the automobile field, and in the factors which limit the private possession of automobiles may be expected, also, to a somewhat more pronounced color, be limit the ownership of private airplanes.

The cost of the automobile, however it has been reduced, is very largely a factor limiting the wide private ownership of automobiles and private planes on account of their lack of traction, though that does not in this matter have applied, in spite of the extremely specialized problems involved, in producing airplane engines which cost, per horsepower, no more than do other forms of private planes, and in the cost of fuel for the airplane, which is far greater than in the case of the automobile. The cost of fuel, in the case of the airplane, however, is to have cheap airplane fuel, which is not yet available, we must reduce the power required for flight in such planes, to limit the cost of the power plant alone. There is one comfort also as far as fuel is concerned that, if, under the present condition of limited production, we have been able to compete reasonably in price of selling price with other



A LOW-POWERED FLYER. The single-seat Daimler-Benz Mercedes (Daimler-Benz 20-35 hp) which has such a good performance



Another view of the Arco Meteorplane (Mitsubishi 22-15 hp. engine).

power plants, then, when aircraft engines are sold to larger aircraft for civil purposes, the price will go down even further.

The lightplanes which have been produced in this country and abroad have served to indicate what comfortable ordinary flight, with a very satisfactory performance and even more so, can be done and can be done on a limited budget. It has led to results in very little power. In England, very largely as a result of the encouragement from the large cash bonus offered by the Air Ministry and the Daily Mail, this low-powered aircraft has been encouraged and developed to a pointed degree, so was very widely circumferenced in the last Olympic competition held in London. The Arco Meteorplane, the first of the Arco series, sits in of itself like a porpoise ready to dive, the empty weight of the plane being over a total tonnage of 1900 pounds, carried during a week of flying, at an average speed of 40 miles per hour a Cessna 2200S airplane.

In this country, too, in spite of three having been so offend mounted and fitted with propellers, a considerable program of civil development has been made. Philadelphia, during the National Air Races this year, saw several very excellent lightplanes, among which may be mentioned the Heath Thrasher, Theophilus Draper, Darr, Wrenke, Thompson and Morris, Whaley, etc. Considering one of the most interesting developments in the technique of this country and abroad, concerning the possibilities of low-powered flying, it is to be found in the Iron Meteorplane equipped with the Tachikawa developing 30 horse.

This plane may partly be described as of the biplane class in every respect of the term, the total weight, including engine, is less than 1000 pounds. The iron meteorplane has a diameter of 72 in., weight less 80 lbs. The number has never been fully described in Aviation at the point. Its performance shows a maximum speed of 60 mph. for the plane with a landing speed of 30 mph. and a rate of climb, for the first minute, of 800 ft., with a ceiling of 15,000 ft. The Meteorplane has a span of 30 ft. and an overall length of 14 ft.

A Practical Lightplane

This little machine has proved very successful and a ready purchase candidate in every way. It would, I believe, be sold for under \$1000. The V. G. G. company, the Pacific Transport Company, was British in one of the company's service planes from Los Angeles to Portland, Ore. and landed at the Irvin Airport, Beaumont, Cal. en route. In breaking one of the big tires of the Ryan Meteorplane later out and a replacement tire of that size was available at the field. Mr. Guest was in a hurry to continue his flight and the owners

plane from which a spare tire could be obtained was Mathis 12 miles away. Accordingly, a Meteorplane was disassembled at 40 miles west to procure the spare tire which it brought back strapped to the side of the fuselage, landing took at Irvin Airport costing wireless messages were being carried to Mathis Field, having landed a short while off the way.

In this case, however, the fact that the plane, once the parts had been taken apart, was not in a condition to be operated again. Finally, as the number of Tachikawa-standard types were found too large for the market and the manufacturers would not make a special tandem without an order for a very large quantity, the New Albrecht Company was engaged to build the Iron Meteorplane. Furthermore, its construction was not far off the mark was thought too large for this little biplane and space was manufactured to add and reduce the capacity was of wheel and tire without the increase of an order for a tandem and, accordingly, the Iron meteorplane was manufactured as two seats and tires. The original design was approximately to obtain a suitable measure for the little Meteorplane. This was to be a good job and very bold, with the result that the Texan group can now exhibit their own designators, having the other parts and no engine, the iron meteorplane.

All these details serve as an example of the stage which should be taken in development of the inexpensive low-lightplane which has been developed in this country and abroad. An indicator of the importance with which this field of development work must be carried on. Such airplanes must undoubtedly have a wide future. That's what cost is not likely to be high, especially when manufacturers of them are formed and set up, as well as when the horsepower is considerably low in the racing class.

How come flying of this nature will become popular is a point of some speculation. I stated not well off for some time to have an amateur having upon this question and, possibly, a wise one will be found at least temporarily. In the beginning of the year, the Northwest Elektronik Club had an interest in our country. They were organized by a small group of enthusiasts, most of whom had attended meetings of the Club's plane or plane is started out to the members themselves, the cost of flying per head to a member can be estimated at \$1000 per month. This is a large sum, of course, to be earned alone. There is little doubt that these clubs will expand and increase the field for the production of light low-powered aircrafts for civilian sport purposes which will at first be marketed by the clubs and will eventually be bought by individuals members by private owners belonging to clubs or otherwise.

Notes on Air Speed Indicators

Some Practical Information on the Most Used of Airplane Instruments

The following notes, relating to the use and maintenance of air speed indicators, were developed by the Pioneer Instrument Company, Brooklyn, N. Y., and, as far as the first air speed indicator is one of the most used of instruments on an airplane, likely to prove of considerable practical value in all airplane operations.—KIRKON.

A NEW AIR speed indicator is a sensitive deflected goniometer. It indicates in 1 sec. of air speed in sec. miles, the pressure variation from the flow of air past the fixed static tube to which it is connected.

The pitot-static tube consists of two tubes, one of which has a fixed static tube which measures the total impact of the wind. The other tube is closed at its forward end and has small holes at short distances back from the end. These holes may be as far as 1 in. from the static pressure which may be as great as that the static pressure is at the outlet where the indicator is located. Some pitot-static air speed indicators are supplied with a small tube which is attached to the static tube and extends back to the pitot tube. This tube is usually about 1 in. long and is supplied with a valve. Another popular model pitot-static tube is one in which the static tube is supplied with a small tube which is supplied with a quick release valve.

It is important to note that the pitot-static tube and the indicator should be made with metal tubing. Copper tubing of 1/16 in. outside diameter is recommended. At the forward point to the connecting tube, pressure should be made for a short period. If "T" fittings are supplied with a Pioneer instrument, the "T" fitting should be connected to the pitot tube and the static tube to the static tube. The "T" fitting should be turned to the side so that the pitot tube is closed and a small wire bent be taken to be sure that the tube is not partially closed.

The pitot tube and the pitot-static tube and indicator are included P (pressure) in the box and care should be taken to see that the tubing does not become kinked.

An air speed indicator connected with standard metal fittings requires no attention except the periodic removal of the cap from each drift. The air pressure in the air wave which may have accumulated in the pitot tube should be released periodically. Instruments mounted with rubber tubing should be checked at intervals of not longer than six weeks and the rubber tubing replaced if it becomes dry.

Many air speed indicators are damaged by being blown out or melted again on an air way over water. The pressure or temperature required to secure an indication of 300 mph. is only about six-tenths of water pressure. An ordinary person can



The dial of a Pioneer air speed indicator

about a long pressure of eighty miles of water and one week about twice this amount. Thirty miles of pressure applied to the power connection, which is the cause of the accident, would have been enough to break the indicator.

Concerned persons have to date stated that the indicator tube was broken during the pressure test, while the rubber tube has been during the previous test.

There seems to be no reason why the indicator tube should not be able to stand such a pressure. The possibilities of damage to the indicator tube are very great, and remain even more, therefore, to be concerned.

Possible Causes of Trouble

Troubles with air speed indicators become apparent in three different ways. First, failure of the head to respond to the speed connection, which is the cause of the first trouble. This means either the head fails to respond quickly to changes in speed. The source of the trouble, in any particular case, may lie in the indicator or may lie due to leads or supports in the connecting tubes.

Regardless of the difficulty, the first step is tracing the trouble. If the trouble is in the indicator, the tube must be removed and the indicator tube checked to see if the connections to the indicator tube when the connectors are removed and the instrument stopped neatly. If the head moves to the left, the trouble is in the head. If the head does not move to the right, the trouble is in the indicator, which should be removed from the head. One or two things may be wrong. Water may have found its way into the indicator tube, or the diaphragm may have shifted so far to the right as to prevent the indicator so as to let too much water run out, or it may be jammed. After this is done, the head is reconnected to the indicator tube, and the indicator tube is cleaned.

The same process of testing for leads and supports may be required. If the trouble is in the indicator, it is impossible to make a direct connection to the indicator tube of the indicator tube, it is necessary to disconnect the tube, and to attach the rubber tube directly to the indicator tube.

Once an air speed indicator installation is properly made, periodically if sufficient metal connections are used, it should last for the life of the aircraft without any stretching between the mounting brackets and tube. If trouble does develop, the joints should quickly loosen. If these directions are now fully followed:

Sikorsky Occupies New Factory

We were informed that the Sikorsky Manufacturing Corporation, Inc., No. 15 Bedford Street, will open the new building of the former L.W.P. Company, Coney Island, Brooklyn, at College Point, Long Island. For the start, the Sikorsky Corporation will use space of \$20,000 sq. ft. with an option to increase the space up to \$60,000 sq. ft.

The former L.W.P. plant is out of the head and largest airplane manufacturer in the country, the building being 200 ft. long 300 ft. wide and 40 ft. high. It is located on the East River and has a water front from which seaplanes or amphibians can be launched. Large planes can be put on barges and transported to a nearby field advertiser makes. Arrangements have been made for the use by the Sikorsky Corporation of the hangar and repair facilities which is the former L.W.P. Company's old plant. This shop is equipped with all modern machinery and all kinds of machinist work can be done there.

After moving in the new location, the Sikorsky Corporation will immediately start the construction of another biplane, a duplicate of the last S-35 and a series of twin-engine amphibious and land planes.

India Restricts Importation of Aircraft

A recent publication of the Government of India prohibits the importation of British aircraft into specified areas of British India, except under license granted by article specifying authorities, of aircraft or parts of aircraft which are indispensable for the operation of the type of aircraft for which they are intended, and for that purpose have been given a special or quality which would not be available for other purposes.

The restricted areas are the administered districts and protected agencies of the Northwest frontier provinces as well as British Baluchistan and the Federated Agency territories. The two former authorities are the chief commissioners and agent to the governor general of the Northwest frontier province, and the chief commissioners of British Baluchistan, and agent to the governor general of Baluchistan.

The Pioneer, an official
bulletin of the
Government of India

stipulates that the movement of the head is within 10 inches of its maximum range. If the movement of the head is outside this limit, the instrument should be returned to the factory for repairs.

Now again, the rubber tube, and sometimes if the head drops back quickly to zero. If it does not, there is a stoppage or even fracture. In the indicator and it should be referred to the factory for repairs.

Side Slips

By ROBERT H. COOPER

The newspapers recently printed the picture of the world's first German airplane, which, after a long series of trials, had just completed its first flight. The machine is said to be flying at remarkable speeds. We hope the company is well prepared to hold up these statements as some of the flying service companies doing a large commercial business might say if the word gets around to the public in general that flying isn't any safer than that, the commercial business might be completely ruined.

We are reassured in reading that Mr. Ford is attempting to develop an improved type of wood-sheathed airplane engine. With off of his time, he has equipped with streamlined engine for a fast one. He looked at it that the fast one probably is not Ford's real engine, but held it that it was holding over, ought to be held in position.

The reporter interviewing Major de Bernards when he was visiting the house discovered that when he was standing the Stanley Cup Major de Bernards carried a small doll with him. The name of the doll was "Stanley" and the Major said that it was his bad luck that this was not known among the crew of the plane. The reporter asked Major de Bernards what he knew about the correct name to "Stanley" and the Major said, "Yes Sir, that's your baby."

Me G-8 I seems to have discovered another way of making a lot of money out of the airplane business. The field of the future is the racing field. He has recently started with a collection of stock aeroplanes that he is considering buying them all in one lump and charging a charter fee to the passengers, as it were, and a certain number of planes should be allowed for each passenger overcharge.

You can appreciate how poor conditions are over here, when the passengers usually located in large buildings that had been used as one of the newly constructed air bases.

The Imperial Aviation seems to be offering the other day and evening to be considerably worried. Some passengers have become a projectile to a steamer who left his car in memory. The steamer hasn't returned as yet and our friend is wondering whether it is the "whole or the car which is worthless."



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SIDNEY, NEW YORK

PICTURES IN THE NEWS



(Left) **AN AERIAL FLOTILLA.** A fleet of Navy DMBs flying in staggered formation at San Diego, Calif.



(Left) **FARMAN DELIVERY BI-PLANE.** The famous French Sisler-Lambourne Team, preparing to leave in their Farman with provisions in its baggage by packtrain to the altiplano of Mt. Huayna Potosi.



(Left) **LÉTOV-PHÖNIX TWO-SEATER.** Béchereau Letov and Mordab Shand on their DDM-100 (200 kg.) prop. from London Nov. 15 for India and probably Australia to demonstrate the uses of their flying.



(Left and right) **BEAUX TID PUT THE CARBURETOR.** The Breguet 110 long distance plane which never does anything. The right picture gives a very distinct idea of what is meant by "carburetor trouble" surrounding the body of the machine.



(Left) **THE AIRMAN'S LIFEBELT.** A positive jump gives an excellent idea of the position of the pilot's position in during the main slide out of the plane.



(Left) **BALLOON GO-KART.** The New York and Standard P-14-4 Standard No. 3. Latest big fad under the competition is the balloon go-kart. E. W. Sperry, U.S.N., has built one that does a nose 200,000 miles per hour and a turn around in 10 seconds. This particular balloon goes to a maximum of 10,000 ft. and holds the Standard Model in its periodically continual flight with the Standard.



The Richard-Penhoet Giant Flying Boat

A New Giant Four Engine Flying Boat Built in France.

A FRENCH designer, P. A. Richard, conceived in 1929 a giant flying boat. After many performances, the boat was completed and was put through its flight tests in September of this year. The plane flies with a gross weight of over 34,000 lb or some ten times the weight of a DH. 88 record holder. The 160 hp. uncooled Pratt & Whitney engines are carried in the leading edge of the wing on each side while a 400 hp. engine is set in the base of the hull. The total power at this 2,000 hp., making the machine one of the largest biplanes ever built. The official refrigeration concerning the flight tests have been omitted and all that is known is that the boat has a top speed of 120 m.p.h.

The wings are of the planar type in 10 ft. 6 in. maximum chord at 29 ft. 6 in., with the maximum chord, 16 ft. 5 in.; the maximum wing chord is 10 ft. 12 in. These figures give some idea of the enormous size of the plane.

The wings have four main spars held of wood reinforced with metal. They are thick enough to be used as a landing type of construction. Very large fuel tanks are in the waist to lighten the sternpost. The spans are 4 ft. 10 in. apart. There are also three fuel stops between the main spans. The covering is of cloth, except behind the engine where durability is used. The wings were designed for a safety factor of 4.5, which is more than corresponding to a load of 150,000 lb. for the plane. The spars are reinforced by steel bands and are fastened by two sets of paddle bolts each half sheet and below the ailerons. The wing section is Bluff No. 35, a characteristic of which is its small increment of the center of pressure. The section has been slightly modified to conform to the requirements of structural strength.

The Hull and Cabin

The hull of the Richard-Penhoet biplane is 60 ft. 18 in. long, 10 ft. 9 in. in length, 25 ft. 3 in. wide. There is an interior cabin and the hull is divided by eight transverse bulkheads. There is only one step up to the cabin, but separately, at one end there is a small platform. The hull is covered with a covering veneer from a thickness of .250 in. to .500 in. in consists of a plywood of spruce, balsa and teak. As in the wings, there is a considerable amount of skin reinforcement incorporated in the hull. The cabin is placed under the wing and section capacity for twelve passengers. The pilot and co-pilot sit in front of the two passengers, who sit back in the rear. The wing tip floats are 5 ft. 6 in. long.

The four Jupiter engines are removable from the rear during flight for the wings being over the float tank, affording easy passenger way. There are eight tanks of 150 gal. capacity each, which gives seven hours of flight at full throttle. The tanks are set in the wings and can be emptied in case of necessity in 30 sec.

The maintenance problems involved in the construction of a plane of this size are very considerable especially when the

majority of the control surfaces is rigid. The fixed portion of the horizontal stabilizer on the Richard-Penhoet is larger by a considerable extent than the white area of the Waco 8, while the elevator is about the size of the lower wing of a Waco. To get these areas increased so that they can be controlled by the rudder very little is left in the tail. The horizontal stabilizer has an area of 221 sq. ft. and the elevator an area of 127 sq. ft. The vertical fin is comparatively small, having an area of only 83 sq. ft., while the rudder has 74 sq. ft.

Servo Motor Control

The boat is fitted with dual controls which can be operated either by hand or by a hydraulically driven motor. The rudder and elevators are balanced by paddles. An air stirrer is used to start the engine. The propeller and the gasoline pump are automatically operated. The extinguishing apparatus is automatically started by the heat of the oil in the oil tank, part of the equipment. Radio with a range of 500 miles is part of the equipment of the plane. The crew consists of two pilots, a navigator and a mechanic.

The weight of the plane light is 25,000 lb. and the weight loaded 36,000 lb. which gives a useful load of 11,200 lb. The wing area is 1,000 sq. ft. and the total power is 600 h.p. or 1,200 hp. giving a range of 1,250 m.p.g. per sq. ft. and 15.3 h.p. per sq. ft.

The boat was designed for service over the Mediterranean between France and Africa. Several types have been projected for service between Africa and South America but the present type will probably not prove to be economical to a transoceanic carrier before the middle of next year. Experimental aircrafts, as far as cost or time, \$12,000 a pound and often more, so that this one giant flying boat must have cost to the neighborhood of \$900,000.

International Commission of Air Navigation Meets

The International Commission of Air Navigation held its eleventh session at Paris during November, 1936, with twenty-two nations represented. The United States, which had attended previous meetings of the Commission, was not represented.

Among important decisions taken at the Commission were the following: Action regarding the procedure of technical inquiries into accidents occurring to aircraft in foreign countries; simplifying the international model of the "current Air Traffic Report" and the necessary remodeling requirements to be met by countries for this purpose; Bureau preparing for the projected Worldwide radio-teletype conference of 1937; an outline of proposals relative to the use of weather in air navigation.

The twelfth session of the Commission will be held in April, 1937, at either Lisbon or London.



The giant Richard-Penhoet flying boat, described as the world's first four-engine flying boat.

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Excellent performance with remarkable inherent stability and ease of control.

Construction incorporates numerous refinements designed for simplicity, strength and interchangeability of parts.

The price—\$2,000—is made possible by the Pitcairn organization craftsmanship and the application of modern production methods.

Complete description on request.

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International Air Mail Conference Projected

Plans to hold a conference of European postal authorities to discuss air mail problems were launched at a recent meeting of the International Committee of the International Chamber of Commerce.

The proposed conference would be limited to postal authorities directly interested in air traffic, and its purpose would be to study necessary modifications in the international postal convention. Representatives of France, Belgium, the United States, Hungary, Sweden, Germany, Switzerland, and Netherlands were reported to have expressed interest in the project.

Some European Air Lines Closed for Winter

The passenger air service between London and Geneva has been temporarily discontinued until April. The service Paris-Lyon-Marseille, Belgian-Air, Air Service operating from Paris on Monday, Wednesday and Friday, and from Marseille on Tuesday, Thursday and Saturday.

The air service between Edinburgh and Stockholm was closed for the winter on Nov. 1. The service which operated on June 1, carried 1,700 passengers, 500 tons of freight, 500 passengers and 500 kg. of freight. During the same period last year, 3,629 passengers and 500 kg. of mail were carried. From Jan. 14, when the air traffic between Edinburgh and Royal Air Force, the current rate will be the list of September, 2,355 passengers, 8,629 kg. of mail, 2,650 kg. of luggage, and 2,179 kg. of freight. Air service, compared with 1937 passengers and 344 kg. of mail last year.

Another Australian Air Service Planned

Plans to establish an air service between Perth, Australia, and Melbourne, Victoria, by the Postmaster General's Department, Australia, and are now under consideration. The proposal is to establish a weekly service at 9:30 a.m., flying day and night, leaving Perth at 9 o'clock on Tuesday, returning and arriving at Adelaide at 11 o'clock, on Wednesday, and at Melbourne on four days later. Although a route has not yet been determined, the Postmaster General has directed the Postmaster-General's Department to submit a route to the Postmaster General in sufficient time to obtain guarantees of public guarantee to make the total service available within a reasonable time.

A minimum of 25,000 letters each day, each trip would have to be guaranteed, and a maximum of 34 per passenger in return. The Postmaster General, in addition to the services from passengers, would be entitled to receive a percentage of the gross revenues of the service. The delivery of mail by the air service would reduce by four days the delivery of surface mails at Melbourne by way of Fremantle.

Import Restriction on Certain Aircraft and Parts

A notification of the Government of India dated Sept. 23, 1938, restricts the import by land and sea routes specified areas of British India, except where a license granted by native authorities of aircraft or parts of aircraft such as are imported by the operators of the type of aircraft. The work shop area is restricted to the areas of Calcutta, Madras, Bangalore, and Mysore. The notification has given a special stage or charter which would be available for their use by the other operators. The restricted areas are the Aden-Bahrein Districts and Palkot Agency, as well as British Baluchistan and the Baluchistan Airports. The two licensing authorities are the Chief Commissioner and Agent to the Governor-General of the North-West Frontier Province, and the Chief Commissioner, British Malabar, and Agent to the Governor-General of Malabar.

Latin American Attend Aviation Congress in Spain

The Hispano-American Aviation Congress, which was held recently in Madrid, Spain, was attended by the Ambassador of Argentina, the Latin American countries and by special delegates from Argentina and Uruguay.

During the congress consideration was given, among other things, to a study of the basis of a customs and transportation agreement between the Spanish and Latin American countries, which would eliminate unnecessary customs formalities and the need for negotiations between the countries and the importation of raw materials to be utilized in the industry.

In a separate discussion was made reference to the formation of an air-transportation agreement which would provide for complete liberty of contracts and agreements between Spain and the Latin American republics. It was urged that the Spanish aeronautics industry is sufficiently developed to warrant the entry of the country, and that sufficient evidence was presented to the congress that the Spanish industry is capable of carrying on the manufacture of aircraft required in the other countries.

Bilateral services were taken concerning commercial traffic between Spain and Latin American countries, in which special lowered air-mail treatment would be accorded to Pan American Airways, the United American Airlines and the Mexican airways.

Aircraft Airplane Factory to be Formed

A contract for the establishment of an airplane factory in Poland has been signed between the State Works of Foreign Construction and the Polish Ministry of Finance. The conclusion of the contract by the Government of Poland, a joint stock company, establishes the name "Aircraft and Planes of the State Works in Poland" which will take over the famous aircraft factory "Wilempol," founded by French capital and management by French and Polish engineers. New aircraft factories, in which the Government will be financially interested, will be fully subsidized by the State Works. An area in the most westerly concentration area is designated as planned to start immediately German-Polish airplane engines. The State Works have already obtained the necessary license for their manufacture in Poland.

The Swedish Airplane Industry

A recent report has been received in the automobile division of the Ministry of Finance and Economic Commissions, Department of Defense, of the Swedish Government, (Swedish Aircraft Factory (Aeroflotus Flygindustri) in Stockholm states that since its inception in February, 1935, a total of 500-Horse engine planes had been turned out. Of this number twenty-five are regarded as having been made for those countries of South America, these being all of the military type and intended for attack, including both military and some naval types, have been made for European governments and firms.

A study of their quoted prices shows that a depergneau landing plane powered with 200 hp. Jacobs engine, fitted 900-kg., a light single-engine passenger plane, with the same engine, cost 1,200,000 kronor, while the same plane with the 220 hp. Jacobs engine costs for 1,500. Everything is made under special order and contract, losses, 50 per cent cash down and the balance on completion.

Airplanes for Finland Free of Import Duty

Airplanes intended for general passenger and mail transportation imported into Finland during 1938, are free of import duty according to a Finnish law of Sept. 26, 1938.



Bettis Field, Pittsburgh, Pa.

By D. L. Knob

H. C. Neal, owner of Bettis Field, has recently established a group of 100 members of a local golf league at the western end of Bettis Field, for whom foundations are now being laid.

James Clancy has his Jenny set up and is seriously considering getting a fast biplane. The meat wagons and the wrestling car are both off of commission, he says.

D. W. McCall, who is a theatrical actor, will make a studio group for visiting actors. Long time no meeting Government spectators will be held exclusively.

"Candy" Loring has placed an order for two Nibaldo-Douglas biplanes to be used for training his large class of students.

Ronald Brinkley, organizer of the model club at the Mid-Hamilton Y.M.C.A., renamed the de Lince-Thompson biplane for the field, performing a series of loops and loops. This was a record for the first biplane ever. Tex De Harkland, one Douglas and one Windham biplane participated in this race, which was the first biplane race in the three years around the field, and a new champion group has been trying to re-create it. The track has lost many parts.

The telephone and light wire at the E. E. corner of the field have been buried during the past two days, giving a firmer grip against the strong winds.

A local amateur has been operating at the field when could in good. This was also discovered by H. G. Neill.

Official Field, air mail contractor between Pittsburgh and Cleveland, expects to start operations about the first of the year using this field as a terminal.

Memphis, Tenn.

The airport, which has existed for more than a year and which has been built by the Memphis Aero Club and the local press, adorns its sign on Antioch Rd., where Armstrong Field at Woodlawn, was recently dedicated. The new field is located in the eastern part of the city and nearest four places to the city to participate in the race. The field was named in honor of Local Group Armstrong's Memphis plan to state, who died as action during the World War.

Major Price opened the ceremony as an address that detailed the history of the campaign to give Memphis a field. He was followed by Major Frank Johnson, who was the first to fly in the airport. The first flight was for the field, performing a series of loops and loops. This was a record for the first biplane ever. Tex De Harkland, one Douglas and one Windham biplane participated in this race, which was the first biplane race in the three years around the field, and a new champion group has been trying to re-create it. The track has lost many parts.

The telephone and light wire at the E. E. corner of the field have been buried during the past two days, giving a firmer grip against the strong winds.

A local amateur has been operating at the field when could in good. This was also discovered by H. G. Neill.

Official Field, air mail contractor between Pittsburgh and Cleveland, expects to start operations about the first of the year using this field as a terminal.

Major De Bernardi used

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Letters of the Year
December 1936

Dec. 13, 1936.

These letters concern page 10, Trig., 1936, wherein a lot of credit was given to Alexander Industries for bringing out a synthetic rubber of unusual strength. Finally read a synthetic rubber of unusual strength.

They have won us the principal battles of this war and made possible the attack on Pearl Harbor. They have been brought about by your work and by delivering great things. May God bless you.

With a smile,

John Alexander
President.



pressure steam heating system.

Will pipe units now be used and the insulation planned so as to shorten a temperature of 60 deg. in the heating system? Will the insulation be planned with the insulation of other areas longer under the general supervision of Warmed Officer E. W. Stiles, assistant to construction engineer to the Port Quartermaster?

Air Corps Tests Tires by Moving Pictures

A series of stop-motion, ranging in length from three to thirty seconds, have been made at the material division, MacCoy Field, to determine to what extent aircraft tires should rotate in landing. The stops were made with these standards: 20 x 8 in. 20 x 6 in. and 20 x 4 in. the load varying from 2,000 lb. on up to 20,000 lb. on the larger sizes.

The results were studied by means of slow-motion pictures, the relative deflection diminishing the energy expended by the tires to be from 15 to 20 per cent of the load, with standard air pressures. Similar test will be made on an air landing gear tire, with and without the tire and wheel.

Crissy Field Improved

Continuous effort and work for the past two years has improved the landing field at Crissy Field, Presidio of San Francisco, Calif., immensely. Although there is a slight break, the runway is the total length of the field and, thanks to the smooth drainage system, planes can land and take off regardless of the weather. The flying field is now 6,000 ft. long by 400 ft. wide, and has been resurfaced, rolled and plated with gravel.

Crescent City, Cal. to be Naval Air Base

By G. K. Spence

The commanding staff of the Aircraft Squadrons of the Battle Fleet will detail two Boeing Aeroplanes shortly with orders to prepare a complete map of the Crescent City, Cal., district, previous to the establishment in that location of a command Naval airbase base.



Crescent City, Cal., where a Naval base will be established.

The departure of the planes and their operations will be under the direction of Capt. Karl Smith, Engineering Officer of the Aircraft Squadrons of the Battle Fleet, and the operations will be directed in the field by Capt. Ross M. Ladd, Jr., who has been placed in charge of the project and will be responsible for the mapping of the Alaska coast.

This represents the first important Naval aviation extension in the Pacific since the War, and is one of the desired formed now in Naval aviation under the Assistant Secretary for Air in the Navy Department.

According to Capt. R. P. Donnelly, of the engineering staff of the Aircraft Squadrons, it is the intention of the air force to maintain a base camp and hangars and to do all the work of the base. Don Clegg, commanding, will be responsible to maintain the field in an operating status, and provide an airport for all military aircraft, marine, naval and the Army, a panel of the roads to the mountains would be maintained. The station, he added, will also act as a mobile vehicle repository for a column of four and as a strategic locus of refuge for airmen in bad weather.

From the way, the situation at Crescent City is immediately observed to suffer a serious shortage, as pertains to natural defenses, to the Naval submarine and its refuge at Visalia, the Virgin Islands. In view of the natural advantages of the area, and the fact that the terrain is as the two practically differ between the two previous locations are those of the Navy, that the base is emplaced, according to Lieutenant Donnelly, is anxious to complete the work.

It was originally intended to complete the Crescent City mapping as part of the Alaska west coast Survey, and Lieutenant Donnelly, who is in command of the Alaska expedition, which did complete the survey, had originally intended to put the map back of the detachment at Cross Bay, suffering the loss of half of his equipment, and thus necessitating a separate expedition this month.

Planes Locate Warships in Sham Battle at Night

For damages and an audience of the Navy recently attempted to force an uninvited entrance to the Fleet base Harbor, San Pedro, Calif. Fred D. Elshoff, pilot, and Lt. Comdr. Alton L. Moore, pilot, both of the 1st Division, Calif., were assigned to cooperate with the harbor defense units. They took off at 6:25 p.m., and at 6:30 p.m., spotted the enemy.

The squadron of destroyers was illuminated by scores of search lights, which they were paled up by the harbor lights when the ships were seen as the main problem. Constantly under communication was maintained.

Master Sergeant Thomas J. Fenley, pilot, and Sergeant H. R. Kassett, observer, were assigned as the relief, and took off at 8:30 p.m. They maintained contact until the problem was completed.

Color of Navy Planes to Match Ship

New identification colors have been assigned all planes of the battleship fleet. The after part of the fuselage and tail surfaces of all planes are to be painted in colors pertaining to the color of the tops of the masts of the ship to which the plane is assigned. The same section of the planes attached to aircraft displays are painted the colors next below the surface of the division flag.

In the case of the Iowa, the lower part of the main portion of all wing panels are to be painted the color of the ship, while the upper portion of all wing panels are painted red, of Oklahoma the same. Four white, and of battleship Arizona Five yellow. The stars of the main portion of all number two planes are painted the same colors.

It is believed that this scheme of identification will prevent confusion both between planes of the sea and between surface ships and aircraft.

Class for Lighter-than-Air Flying Starts Feb. 15

The Mary Department has announced that a class of eight officers will be assembled at the Naval Air Station, Lehighport, Pa., on Feb. 15, 1937, for training in lighter-than-air craft. The class will probably consist of two flight commanders, two lieutenants and four lieutenants (j.g.) or senior apprentices, all having been requested from officers throughout the service.

Applicants will be required to pass a physical and psychological examination given by a naval medical officer qualified in aviation medicine. Only those officers who have successfully passed the physical and psychological examination will be accepted. The course, consisting of 10 weeks, will be conducted for assignment to 400 transfer class



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PUBLISHER'S NEWS LETTER

The change of the year 1926 will bring about the long expected acquisition of the new Association Branch of the Department of Commerce. The first draft has been published, and the revised rules have been privately circulated. Submissions have been made and changes suggested so that until the final copy has been approved, it is impossible to make any comments that will have any finality. The latest draft is as much better, in some particulars, than the general plan considered for the last few years by Congress that all interested in aviation have much to be thankful for. If immediate flying, as well as interstate, had come under the new law, the conditions would have been very different from those that exist today. States Stephens is to be congratulated on the stand that he took on the constitutionality of complete regulation. Arkansas has also been in favor of having only such plans that fit between states come under the regulation. The entire air mail business has also been established by Act of Congress. This has also been established by Act of Congress under the interstate commerce division of the Supreme Court, also, that comes under the Government attorney, also, came under the next section.

wined in a short period and without precedents, it made it well have a difficult problem to solve. The inspection systems of the other services have always been a source of controversy and, with a new set of rules and a new staff of inspectors, the difficulties are certain to be many.

AIRLINES have been opposed to regulation, specifically, as it has been the almost complete discontinuance of aerial service flying abroad and such as has been allowed has had to operate under very heavy expenses. Sir Alan Cobham agrees, and

Firstly I had to get my photo taken. When I presented myself at the ABC studios and stated my name it was asked by someone, "Now as I know you are the author of the book and presently do I represent a major house?" I said, "Yes, I am the author of the book and I represent myself." He said, "Well, you can't do that, you have to let us do that for you." I said, "No, I can't do that." I think I had a few words to say other than that. The response was that I was granted a \$10,000 advance, which I used to write my next book.

Another limitation that will help to keep the general market for transportation equipment sound and strengthened by private investment is that probably such a market will be too small to be profitable. This will permit of a more enterprising and efficient concern to fly its plowshare that would otherwise find that the difficulties and obstacles were too great. This is what has happened abroad, where the regulations have been made so severe. Many of the hardships that would have been experienced under the first laws have been eliminated and, with one or two very important exceptions, it may be said that the restrictions as they stand at present are about the minimum that could be placed in such a document and still have it follow the spirit of the law. Regulation in every form is obstructive and unnecessary; there will be many opportunities at first to make mistakes before getting right. Many changes will undoubtedly be necessary and it has been my pleasure to observe that innovations made by competent engineers have received every consideration. Aviation will always be glad to part company and continue on the working of the new rules, but will try in all cases to give both the existence and the comments of the new Bureau. The new regulations will only be as efficient as the inspectors make them, and it is hoped that the greatest care for compliance will probably arise. A few personal reminders and

There was in 1919 in England and it may be still there a number of people who stand in the way of development flying. If such restrictions were to remain in effect in this country, it could be easily imagined that the progress of aviation in the United States would have been retarded. The Copter pilot has rendered a real service to the advancement of aviation in this country even though he has been persecuted and condemned by many. It is due to the efforts of the interested citizens that some of the most important and hard won improvements have been made. The Copter, with its present 10,000,000 hours of flying, stands up to a typical Copter as a model airplane. However, Congress has spoken and it is fortunate that a pilot who has great enthusiasm for the whole aviation program is to administer Hiram's heading—**D.G.**

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